

## REMARKS

By the above amendment, an informality in the specification has been corrected, independent claims 1 and 8 have been amended to recite further features and to clarify features of the present invention, and new claims 15 - 25 have been presented, wherein claims 15 - 24 are dependent claims, and claim 25 is a new independent claim. Applicants submit that all claims patentably distinguish over the cited art, as will become clear from the following discussion.

The rejection of claims 1 - 7 under 35 USC 102(b) as being anticipated by Shahidi (US 6,591,130) and the rejection of claims 4 and 8 - 14 under 35 USC 103(a) as being unpatentable over Shahidi in view of Macvicar et al (US 5,215,095) and further in view of Culver (US 4,417,591), such rejections are traversed insofar as they are applicable to the present claims and reconsideration and withdrawal of the rejections are respectfully requested.

As to the requirements to support a rejection under 35 USC 102, reference is made to the decision of In re Robertson, 49 USPQ 2d 1949 (Fed. Cir. 1999), wherein the court pointed out that anticipation under 35 U.S.C. §102 requires that each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. As noted by the court, if the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if the element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." Moreover, the court pointed out that inherency, however, may not be established by probabilities or

possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

As to the requirements to support a rejection under 35 USC 103, reference is made to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), wherein the court pointed out that the PTO has the burden under '103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

At the outset, applicants note that as illustrated in Figs. 3 and 4 of the drawings of this application, the present invention is directed to a biological light measuring instrument wherein light is irradiated from a plurality of light irradiation positions as represented by the black circles on the head of a subject in Figs. 3 and 4, and the light beams, which are irradiated from the plurality of light irradiation positions, pass through the inside of the subject and are detected at a plurality of the detection positions, as represented by the white circles in Figs. 3 and 4, noting that the light beams pass through measurement positions, as represented by the squares indicated at the inside of the head of the subject in Figs. 3 and 4, whereby the light beams are changed so as to obtain information regarding the area of passage of the

light beam through the subject. In accordance with the present invention, a signal processor prepares a topographic image representing ecological information about the inside of the subject by using quantities of light detected by the light detection means at the individual detection positions which includes, as recited in claim 1, for example, means for setting three-dimensional coordinate data indicative of the positional relation between the light irradiation and the light detection positions and reference points which are set on the subject as well as means for generating a three-dimensional topographic image on the basis of the three-dimensional coordinate data as described in the specification of this application. Further, a three-dimensional morphological image of the subject and reference points set thereon which is obtained, is memorized, noting that the morphological image may be a topographic image, a CT image or an MRI image, for example. According to the present invention, as described at page 22, in connection with step 710 of Fig. 7, the three-dimensional topographic image is synthesized or superimposed with the three-dimensional morphological image based on the set reference points, whereby a display in the manner of Fig. 10 is obtained. Applicants submit that the aforementioned features are now clearly set forth in each of independent claims 1, 8 and 25, and the dependent claims thereof, and such features are not disclosed or taught in the cited art, as will become clear from the following discussion.

Turning to Shahidi, irrespective of the Examiner's contentions that this patent "shows in Figure 1, a biological light measurement instrument comprising means for irradiating light beams (elements 110, 111) from a plurality of light irradiation positions to a subject (Fig. 1, element 109), light detection (element 105) means for detecting light beams irradiated from said plurality of light irradiation positions and passing through the inside of said subject at a plurality of detecting positions

arranged near positions (see col. 5, lines 51 - 59)" (emphasis added), applicants submit that the Examiner has mischaracterized the disclosure of Shahidi in relation to the claimed invention. More particularly, as illustrated in Fig. 1 of Shahidi and described at column 5 thereof, at least two light emitting diodes (LED's) 110, 111 are mounted on a surgical instrument 109, and emit infrared signals which are sensed by a plurality of infrared sensors 106, 107, 108, mounted in the sensing unit 105, which is mounted overhead and having a view of the operating table seen and the surgical instrument. Applicants submit that the signals emitted by the LEDs 110 and 111 which are mounted at the top of the surgical instrument 109 are only utilized for tracking the position of the surgical instrument, and are not arranged for irradiating the patient's head 112, and do not pass through the inside of the patient's head, as suggested by the Examiner. Thus, irrespective of the position by the Examiner, Shahidi does not disclose or teach "light detection means for detecting light beams irradiated from said plurality of light irradiation positions and passing through the inside of said subject at a plurality of detection positions arranged near said plurality of light irradiation positions", as recited in each of the independent claims of this application. Accordingly, applicants submit that each of the independent claims and the dependent claims of this application, patentably distinguish over Shahidi in the sense of 35 USC 102 with respect to the aforementioned features considered alone. However, applicants submit that Shahidi also fails to provide the other features as recited in the independent and dependent claims in the sense of 35 USC 102 or 35 USC 103. Accordingly, applicants submit that all claims patentably distinguish over Shahidi and should be considered allowable thereover.

As to the combination of Shahidi with Macvicar et al and Culver, the Examiner contends that Shahidi teaches all of the limitations of the claimed subject matter

except for mentioning specifically a method for creating a topographic image in a biological light measuring instrument, as indicated. However, as pointed out above, Shahidi, in addition to the failure to teach the limitations of the claimed subject matter, as recognized by the Examiner, fails, as discussed above, to disclose or teach light irradiation means and light detection means operating in the manner set forth, in which light beams pass through the inside of the subject, and are detected, as well as failing to teach the signal processing means, as defined.

Looking to Macvicar et al, this patent describes that a light is irradiated onto a surface of a brain and a change of an area irradiated with the light is observed with a microscope 4 as described in column 5, lines 1 - 21. In accordance with the teachings of Macvicar et al, a cortical area of the brain 2 is exposed, by removing a portion of the patient's skull in the general area which is to be functionally mapped, and an illuminating means such as a regulated light source 6 serves to illuminate the exposed cortical area. A light filter which is provided on the viewing side of the microscope selectively passes reflected light from the cortical area of a given wavelength or wavelengths. Thus, the detected light is a reflected light from the surface of the cortical area, and the light does not pass through the inside of the cortical area. Thus, applicants submit that Macvicar et al is deficient in the same manner as Shahidi, and applicants submit that the proposed combination fails to provide the claimed features as set forth in the independent and dependent claims of this application. Accordingly, applicants submit that all claims patentably distinguish over the proposed combination of Shahidi and Macvicar et al in the sense of 35 USC 103 and should be considered allowable thereover.

With respect to the further combination of Shahidi and Macvicar et al with Culver, the Examiner contends that the Culver patent teaches the step of preparing a

wiring frame image of said subject as the three-dimensional morphological image of said subject. Contrary to the position set forth by the Examiner, applicants submit that Culver describes that a two-dimensional topograph is displayed by using electroencephalograph signals obtained at electrodes arranged at positions determined with a wire frame, as illustrated in Fig. 1 and described at column 3, lines 8 - 27. Applicants submit that in Culver, the electroencephalograph detects electroencephalograph signals as electric signals, but Culver does not disclose or teach "light detection means for detecting light beams irradiated from said plurality of light irradiation positions and passing through the inside of said subject at a plurality of detection positions arranged near said plurality of light irradiation positions". Furthermore, applicants submit that the wire frame of Culver represents a two-dimensional arrangement of the electrodes, and not a three-dimensional morphological image of a head of the subject, and Culver also does not disclose or teach superimposing the three-dimensional topographic image onto the three-dimensional morphological image based on the set reference points, as recited in the claims of this application. Thus, irrespective of the position set forth by the Examiner, applicants submit that the proposed combination of Shahidi, Macvicar et al and Culver fail to provide the claimed features as set forth in each of independent claims 1, 8 and 25 and the dependent claims thereof in the sense of 35 USC 103, such that all claims should be considered allowable over the cited art.

With respect to the dependent claims, applicants note that the dependent claims recite further features of the present invention and more particularly recite for example, that the ecological information about the inside of the subject which is obtained comprises a change in concentration of hemoglobin, for example, such that the light includes the biological information. Thus, applicant submit that the

dependent claims recite further features which patentably distinguish over the cited art in the sense of 35 USC 103 and the dependent claims should be considered allowable with the parent claims.

The Examiner's attention is directed to US Patent No. 5,419,320 to Kawaguchi et al, which was cited in the International Search Report in the PCT application, and which was submitted with the application papers, as filed. Applicants note that while this patent describes that a functional image and a morphological image are superimposed wherein the functional image is described as a topographic image. However, in this patent, the topographic image and the morphological image are two-dimensional images and there is no disclosure concerning synthesis or superimposing of a three-dimensional topographic image and a three-dimensional morphological image. Further, there is no disclosure or teaching as to how to obtain three-dimensional information of biological information changes at particular positions of the subject. That is, there is no disclosure concerning a distance correction of the two-dimensional topographic image to create a three-dimensional topographic image such that there is no suggestion to create a three-dimensional topographic image based on a change of biological information. Likewise, the patent provides no disclosure that the morphological image includes a specified reference point which is set on the subject to be inspected such that there is no suggestion to obtain a three-dimensional topographic image and a three-dimensional morphological image and effect superimposition or synthesis by performing appropriate positioning.

In view of the above amendments and remarks, applicants submit that all claims present in this application patentably distinguish over the cited art and should

now be in condition for allowance. Accordingly, issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 500.41132X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP



---

Melvin Kraus  
Registration No. 22,466

MK/jla  
(703) 312-6600